CLAIMS

What is claimed is:

1. A method comprising forming a structure attached to a micro-fluidic channel based on hydrodynamic focusing.

2. The method of claim 1, wherein forming the structure comprises solidifying a hydrodynamically focused fluid inside the channel.

3. The method of claim 2, wherein solidifying comprises polymerizing the hydrodynamically focused fluid.

4. The method of claim 3, further comprising promoting polymerization by exposing the hydrodynamically focused fluid to ultraviolet radiation.

5. A device comprising a structure formed by the method of claim 4.

6. The method of claim 1, wherein forming the structure comprises forming a plurality of coatings attached to walls of the channel.

7. The method of claim 1, wherein forming the coatings comprises forming a coating having a greater compatibility than that of the wall of the channel.

8. The method of claim 7, wherein forming the coating having the greater compatibility comprises forming a coating having a greater biocompatibility than that of the wall of the channel.

9. The method of claim 8, wherein forming the biocompatible coating comprises forming a biocompatible anti-fouling coating.

10. The method of claim 9, further comprising flowing a fluid containing a biological molecule in the channel containing the biocompatible anti-fouling coating.

11. The method of claim 8, wherein forming the biocompatible coating comprises forming a biocompatible affinity coating containing a binding material.

12. The method of claim 8:

further comprising flowing a fluid containing a biological molecule in the channel containing the biocompatible affinity coating; and

binding the biological molecule to the binding material of the biocompatible affinity coating.

13. The method of claim 1, wherein forming the structure comprises forming an internal divider wall.

14. The method of claim 13, further comprising tailoring a permeability of the divider wall to a molecule.

15. The method of claim 14, further comprising performing a separation by permeating the molecule across the internal divider wall.

16. The method of claim 1, wherein forming the structure comprises selectively promoting polymerization in a portion of a hydrodynamically focused polymerizable fluid by selectively exposing the portion to an electromagnetic radiation based on a patterned mask to form a structure having a first dimension that is based on hydrodynamic focusing and a second dimension that is based on the patterned mask.

17. The method of claim 16, wherein forming the structure comprises forming a pillar having a width that is based on hydrodynamic focusing and a length that is based on the patterned mask.

18. A device comprising a structure formed by the method of claim 1.

19. A method comprising:

introducing a polymerizable fluid and a focusing fluid into a hydrodynamic focusing system;

hydrodynamically focus the polymerizable fluid with the focusing fluid; and

forming a structure in the hydrodynamic focusing system by polymerizing the hydrodynamically focused polymerizable fluid.

20. The method of claim 19, further comprising, prior to said forming, promoting polymerization by exposing the hydrodynamically focused polymerizable fluid to an electromagnetic radiation.

21. The method of claim 20, wherein promoting polymerization comprises selectively promoting polymerization in a portion of the hydrodynamically focused polymerizable fluid by selectively exposing the portion to an electromagnetic radiation based on a patterned mask to form a structure having a first dimension that is based on hydrodynamic focusing and a second dimension that is based on the patterned mask.

22. The method of claim 21, wherein forming the structure comprises forming a pillar having a width that is based on hydrodynamic focusing and a length that is based on the patterned mask.

23. The method of claim 19, wherein forming the structure comprises forming a plurality of coatings attached to walls of the channel.

24. The method of claim 19, wherein forming the structure comprises forming an internal divider wall.

25. The method of claim 19, further comprising performing a separation by permeating a molecule across the internal divider wall.

26. A device comprising a structure attached inside a micro-fluidic channel of a hydrodynamic focusing system, wherein the structure has a dimension that is based on hydrodynamic focusing.

27. The device of claim 26, wherein the dimension is based on a flow rate of a hydrodynamically focused fluid.

28. The device of claim 26, wherein the structure comprises a plurality of coatings attached to walls of the channel.

29. The device of claim 28, wherein the coatings comprise a material having a greater biocompatibility relative to a biological molecule compared to a material of a wall of the channel.

30. The device of claim 26, wherein the structure comprises an interior divider wall attached between a first wall and a second wall of the outlet channel and having voids on opposite sides thereof.

31. The device of claim 26, wherein the structure comprises a structure having a first dimension that is based on hydrodynamic focusing and a second dimension that is based on a patterned mask.

32. The device of claim 31, wherein the structure comprises a pillar having a width that is based on hydrodynamic focusing and a length that is based on the patterned mask.

33. The device of claim 26, wherein the structure comprises a material that is different from a material of a wall of the micro-fluidic channel.